CHAPTER 4 Learning Theories - Behaviorism

LEARNING OUTCOMES

After studying this chapter, you should be able to:

1. Explain the principles of classical conditioning, operant conditioning and social learning theory;
2. Compare among classical conditioning, operant conditioning and social learning theory; and
3. Apply the principles of classical conditioning, operant conditioning and social learning theory in classroom teaching.

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INTRODUCTION

Learning is the main focus in the field of educational psychology. In Chapter 1, we have briefly explained the meaning of learning from three major perspectives including the behavioural perspective. In this chapter, we shall extend the discussion of behavioural approaches to learning in greater detail.

We begin by discussing the classical conditioning. Next, we examine the definition and concepts of operant conditioning. This is followed by the explanation of the principles in the social learning theory. In the final section of this chapter, we look at the application of the principles of classical conditioning, operant conditioning, and social learning theory.

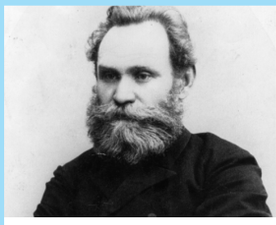
4.1 CLASSICAL CONDITIONING

The concept of classical conditioning was developed by a Russian physiologist, Ivan Pavlov (1849-1936). According to Papalia, Feldman, & Olds, they define the classical conditioning as:

> Classical conditioning is a type of learning which based on the association of a stimulus that does not ordinarily elicit a particular response with another stimulus that does elicit the response.
>
> **(Papalia, Feldman, & Olds 2007).**

From the definition above, we understand that the key element in classical conditioning is association. It means that if two stimuli repeatedly experienced together, they will become associated. For example, if a student frequently encounters unpleasant stimuli in Mathematics class such as unfriendly teachers, difficult questions, and a lot of homework, he may learn to dislike Mathematics.

4.1.1 Pavlov's Experiments



Ivan Pavlov,
Russian physiologist

Pavlov discovered classical conditioning almost by accident. Originally, he wanted to study the role of salivation in digestion. He measured how much saliva dogs produce when given meat. After a few days in the experiment,Pavlov noticed that the dogs in his laboratory started salivating when the lab attendant entered the room with the meat dish, before meat was placed in their mouth.

This aroused Pavlov's curiosity and he pursued the issue with more experiments. For example, he sounded a bell just before presenting his dogs with food. After hearing the bell many times right before getting fed, the dogs began to salivate as soon as the bell rang. In other word, the dogs had been conditioned to salivate in response to a new stimulus (the bell) that normally would not produce salivation. The dogs had learned to associate the bell with food.

4.1.2 Types of Stimulus and Response

Remember from Chapter 1 that a stimulus is an observable environmental event that has a potential to exert control over a behavioural response. A response is an over behaviour by a learner. Put it in a simpler way, a stimulus is anything that can directly influence behaviour and the stimulus produces a response.

In classical conditioning, there are 2 types of stimulus and 2 types of response. They are unconditioned stimulus, conditioned stimulus, unconditioned response, and conditioned response as explained in figure 4.1.

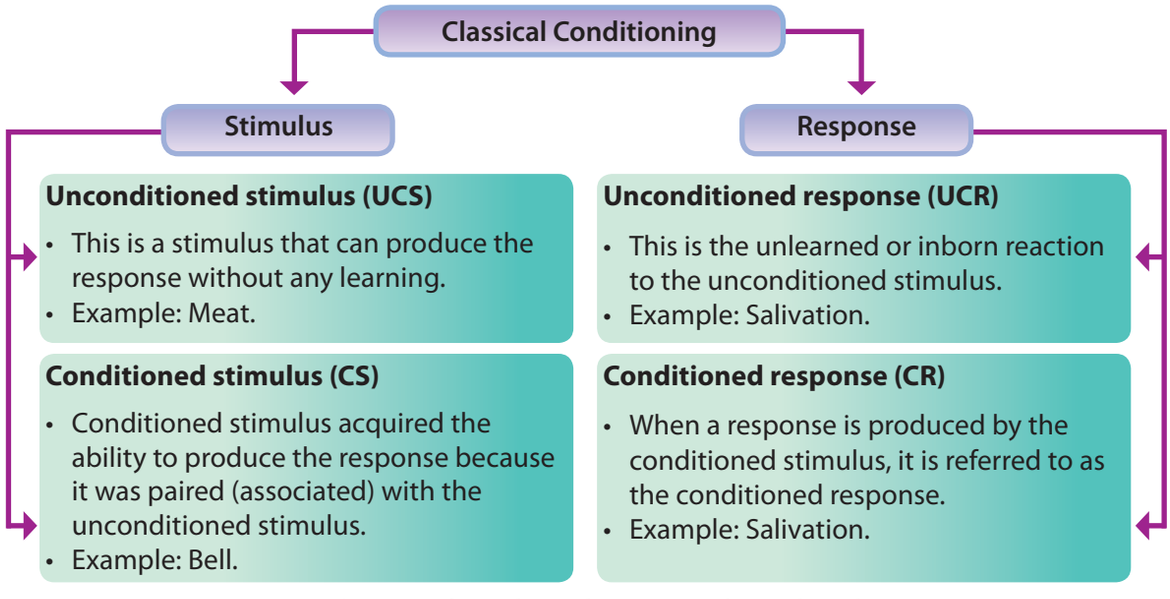

Classical Conditioning
Stimulus
Response
Unconditioned stimulus (UCS)
• This is a stimulus that can produce the response without any learning.
• Example: Meat.
Unconditioned response (UCR)
• This is the unlearned or inborn reaction to the unconditioned stimulus.
• Example: Salivation.
Conditioned stimulus (CS)
• Conditioned stimulus acquired the ability to produce the response because it was paired (associated) with the unconditioned stimulus.
• Example: Bell.
Conditioned response (CR)
• When a response is produced by the conditioned stimulus, it is referred to as the conditioned response.
• Example: Salivation.

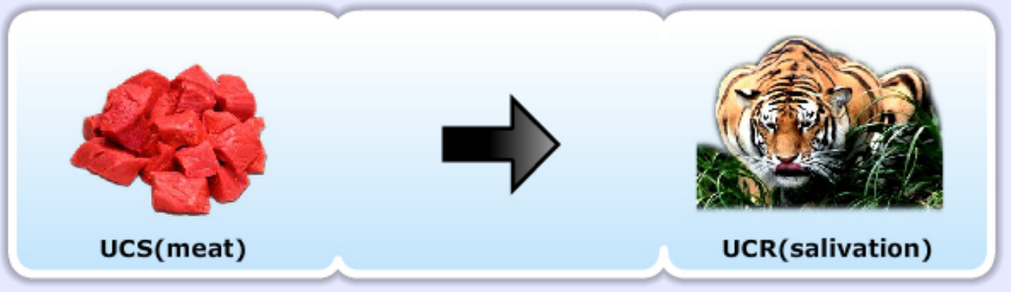
Figure 4.1: Types of stimulus and respons in classical conditioning

Look at Figure 4.2 to help us understand the meaning of these stimulus and responses as well as the steps in the process of classical conditioning.

Step 1 – Before conditioning

Before conditioning, the bell is a neutral stimulus. Neutral stimulus(NS) is a stimulus that, before conditioning, does not naturally bring about the response of interest(Feldman, 2005).

However, an unconditioned stimulus(UCS) can produce an unconditioned response(UCR).



Step 2 – During conditioning procedure

During the conditioning procedure, the neutral stimulus(NS) is presented. It is immediately followed by the unconditioned stimulus(UCS) to produce unconditioned response(UCR).

Step 3 – Test of conditioning

After the classical conditioning procedures, the neutral stimulus (NS) becomes a conditioned stimulus(CS). It alone can produce salivation. At this point, the production of salivation is known as the conditioned response(CR).

Figure 4.2: Process of classical conditioning

4.1.3 Common Phenomena in Classical Conditioning

There are 3 common phenomena in classical conditioning, they are generalization, discrimination, and extinction. The descriptions for these phenomena are explained below.

Generalization	Generalization occurs when similar stimuli to a CS produce the CR. A student may generalize his fear to physics and chemistry tests although he had performed poorly only on mathematics test. In this case, the physics and chemistry tests were similar stimuli to the mathematics test and they produced the CR by themselves.
Discrimination	Discrimination is the opposite of generalization. It refers to the ability to differentiate between similar stimuli. For example, a student may feel fear during mathematics test but not during physics or chemistry tests. This shows that the student is able to discriminate between appropriate and in appropriate situations for a response.
Extinction	Extinction is the process of unlearning a learned response because of the removal of the original source of learning. In classical conditioning, extinction is done by repeatedly presenting the CS without the US. This action will decrease the frequency of previously CR. Eventually, the CR disappears. In the example mentioned above, if the student repeatedly passes the mathematics tests, his fear of mathematics tests will disappear.

SELF-CHECK

1. List three examples of learning from the behavioral perspective.
2. Describe some examples of classical conditioning from your experience.
3. Think of ways in which classical conditioning is used by advertisers.

4.2 OPERANT CONDITIONING

Operant or instrumental conditioning is a form of learning in which the consequences of behaviour lead to changes in the probability that the behaviour will occur. Thondike (1874-1949) was the pioneer in studying this kind of learning. His famous formulation of Law of Effect lies at the heart of the operant conditioning. The Law of Effect states that:

> "Behavior that brings about a satisfying effect (reinforcement) is apt to be performed again, whereas behavior that brings about negative effect (punishment) is apt to be suppressed."
>
> **(Morris & Maisto, 2001)**

4.2.1 Types of Reinforcement and Punishment

Reinforcement is a consequence that increases the probability that a behaviour will occur. On the other hand, punishment is a consequence that decreases the probability a behaviour will occur. Put it another way, reinforcement will strengthen a behaviour while punishment will weaken a behaviour. There are 2 forms of reinforcement and punishment as shown in figure 4.3.

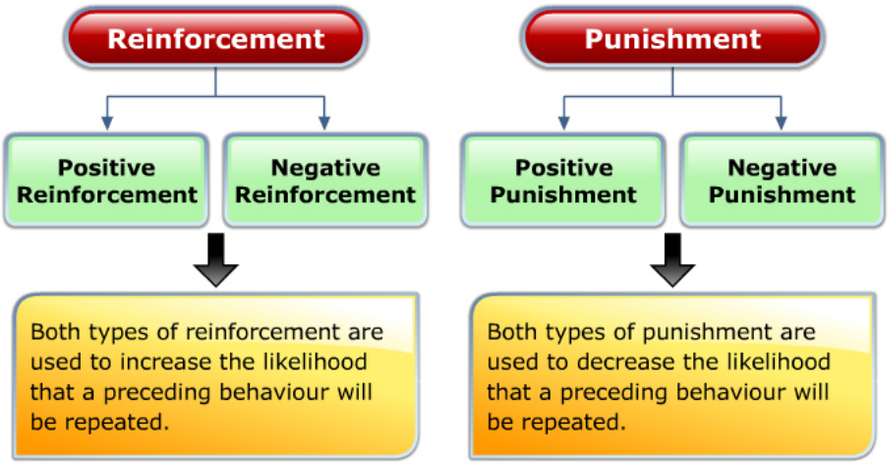

Reinforcement
Punishment
Positive Reinforcement
Negative Reinforcement
Positive Punishment
Negative Punishment
Both types of reinforcement are used to increase the likelihood that a preceding behaviour will be repeated.
Both types of punishment are used to decrease the likelihood that a preceding behaviour will be repeated.

Figure 4.3: 2 types of reinforcement and punishment

Take note that when something is added or presented, the process of learning is called positive and when something is removed or taken away, the process of learning is called negative. Table 4.1 helps us to understand these forms of reinforcement and punishment.

Table 4.1: Forms of Reinforcement and Punishment

Form of consequence	Description	Example
Positive reinforcement	Receiving something pleasant will increase behaviour occurrences.	A student is praised for asking question. Subsequently, the student asks more questions.
Negative reinforcement	Removing something unpleasant will increase behaviour occurrences.	A son who is tired of hearing his father's nagging will does his homework. He does the homework to remove the nagging (Santrock, 2008).
Positive punishment	Receiving something unpleasant will decrease behaviour occurrences.	If a teacher frowned when his student asked a question, the student would be less likely to ask question again.
Negative punishment	Removing something pleasant will decrease behaviour occurrences.	A misbehaving student is removed from the class.

4.2.2 Schedule of Reinforcement

Reinforces are more effective when they are given as soon as possible after a student performs the target behaviour. In continuous reinforcement like this, a student learns very rapidly but when the reinforcement stops, the behaviour decreases rapidly too. Therefore, the schedule of reinforcement was developed. The schedule will determine when a behaviour will be reinforced. There are 4 types of schedule of reinforcement, they are fixed-ratio schedule, variable-ratio schedule fixed, fixed-interval schedule, and variable-internal schedule. Look at Figure 4.4 to understand the meaning of these schedules.

Fixed-ratio schedule	• A behavior is reinforced after a set number of responses have occurred. • For example: A student may be given a bar of Kit Kat chocolate for every ten mathematical problems solved.

Variable-ratio schedule fixed	• On a variable-ratio schedule, the number of responses needed to gain the reinforcement is not constant. • For example: Rewards could be given after 3, 5, 9, and 15 mathematical problems solved. • On a fixed-ratio schedule, a behavior is reinforced after a set number of responses have occurred. • For example: A student may be given a bar of Kit Kat chocolate for every ten mathematical problems solved.
Fixed-interval schedule	• A behavior will be reinforced after a certain period of time. No matter how often it occurs, the behavior will not be reinforced until the time is up. • For example: Students are given a quiz every Wednesday.
Variable-internal schedule	• Also based on time passing but the time period keep changing. • For example: Students are given pop quizzes.

Figure 4.4: Schedule of reinforcement

4.2.3 Dangers of Punishment

Punishment presents the fastest way to changing behaviour. However, punishment might be dangerous to an individual. Among of the effect of punishments are:

- Punishment can be abusive.
  - For example, a teacher might become so aroused when he is punishing a student that he becomes abusive.
- Punishment may create a new problem, that is aggression.
  - Students commonly react to physical punishment by learning to dislike the punisher and perhaps by reacting aggressively toward that person.

Thus, punishment does not convey any information about what an alternative and more appropriate behaviour might be. It may suppress one inappropriate behaviour only to be replaced by another one. Punishment can turn out to be reinforcing. A student might learn that misbehaving will get the teacher's attention.

As a conclusion, punishment should be used only as the last option. Do not use positive physical punishment. Use negative punishment, instead. A teacher should first positively reinforced appropriate behaviours to take place of the inappropriate behaviours he is trying to eliminate.

SELF-CHECK

1. Explain the types of reinforcement and punishment.
2. List some similarities and differences between classical and operant conditioning.

4.3 SOCIAL LEARNING THEORY

Social learning theory extends behaviourism. Both behaviourism and social learning theory agree that experience is an important cause of learning. They also include the concepts of reinforcement and punishment in their explanation of behaviour. Furthermore, they agree that feedback is important in promoting learning (Eggen and Kaucak, 2007).

4.3.1 Observational Learning

Most of the principles of the social learning theory were developed by Bandura (Papalia, Olds & Feldman, 2007). Social learning theory believes that students learn by observing or watching and imitating other people. This process is called modelling or observational learning.

According to Hinrichs,

> "Observational learning is so common and so powerful"
>
> **Hinrichs, 2004**

One of the most important examples is the effect of watching violent media has on aggressive behaviour as shown in Figure 4.5.

Figure 4.5: Among of the effects of watching violent media.

The newer version of social learning theory is called the social cognitive theory. The change is due to a greater emphasis on cognitive processes in learning.

According to Bandura;

> "Both social and cognitive factors play important roles in learning."
>
> **Bandura (1989)**

There are 4 processes involved in observational learning. These include attention, retention, production, and motivation as explained in figure 4.6.

Process 1- Attention
Before students can imitate a model's behavior, they must pay attention to what the model is doing or saying. For example, seeing a teacher writing from the same perspective as the student see their own makes observational learning easier.
Process 2- Retention
To produce a model's action, students must be able to store the model's action in their memory for future retrieval. Students' retention will be improved when a teacher gives vivid, logical, and clear demonstrations.
Process 3- Production
To attending and remembering, students must be physically capable of reproducing the model's action. Here, the students need a lot of practice, feedback, and coaching before they can reproduce the model's action.

Process 4 - Motivation

The students must be motivated to demonstrate the model's action. Reinforcement can be use to encourage observational learning. For example, a teacher can use direct reinforcement such as saying "Good work!" Alternatively, a teacher may want to use vicarious reinforcement. In this case, a student may simply see other students being reinforced for a particular behavior and then he increases his own production of that behavior.

Figure 4.6: 4 processes involved in observational learning

4.3.2 Reciprocal Determination Model

Bandura developed a reciprocal determination model that comprises 3 factors. The factors are behaviour, person, and environment as shown on Figure 4.7.

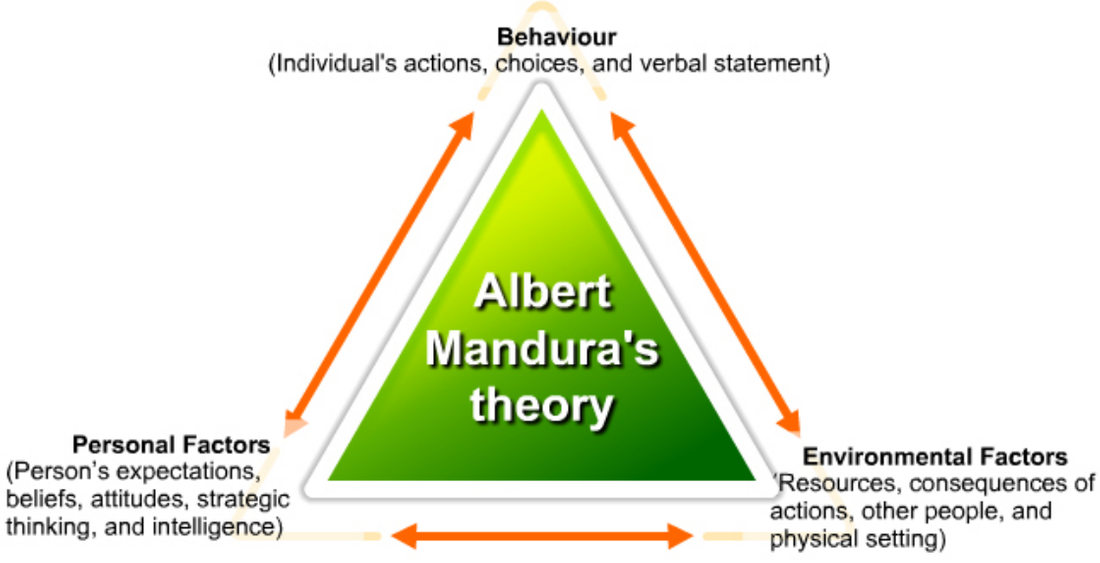

Behaviour
(Individual's actions, choices, and verbal statement)
Albert Mandura's theory
Personal Factors
(Person's expectations, beliefs, attitudes, strategic thinking, and intelligence)
Environmental Factors
(Resources, consequences of actions, other people, and physical setting)

Figure 4.7 Interactions of 3 factors in reciprocal determination model

Behaviour, environment and person factors interact to influence learning. They influence and are influenced by each other. For example, a teacher's feedback(environment) can lead students to set higher goals(person/cognitive) and these goals will motivate students to put more efforts (behaviour) in their studies.

SELF-CHECK

1. How would observational learning be useful to you as a teacher?
2. What are some contributions and criticism of the social learning theory?

4.4 BEHAVIOURISM IN THE CLASSROOM

This section describes how teachers can apply the principles of behaviourism in the classroom. It is divided into three subsections according to the perspectives discussed earlier that are classical conditioning, operant conditioning and social learning theory.

4.4.1 Applying Classical Conditioning in the Classroom

The key element in classical conditioning is association. Therefore, teachers are encouraged to associate variety of positive and pleasant events with learning and classroom activities. For example, a teacher may:

- Use attractive learning aids.
- Decorate the classrooms.
- Encourage students to work in small groups for difficult learning tasks.
- Greet the students and smile at them when he comes to the classroom.
- Inform the students clearly and specifically the format of quizzes, tests, and examinations.
- Make the students understand the rules of the classrooms.
- Give ample time for students to prepare for and complete the learning tasks.

4.4.2 Applying Operant Conditioning in the Classroom

In operant conditioning, the consequences of behaviour produce changes in the probability that the behaviour will occur. Reinforcement and punishment are the 2 main concepts in operant conditioning. The following are some examples on how operant conditioning can be applied in the classrooms.

- Recognize and reinforce positive behaviors and genuine task accomplishments.
- Use various types of reinforcement such as teacher approval (praise, smiles, attention, and pats on the shoulder), concrete reinforcement (cookies, candies, and stationeries) and privileges (longer recess time and more time with friends).
- Reinforce good behaviors and punish bad ones consistently.
- Use schedule of reinforcement, such as surprise rewards, to encourage persistence.
- Use positive punishment as the last option. Use negative punishment, such as detention class, instead.
- Punish students' behavior, not their personal qualities.
- Tell the students which behavior is being punished.

4.4.3 Applying the Social Learning Theory in the Classroom

The social learning theory focuses on how people learn by observing and imitating others. To motivate learning using this approach, a teacher may:

- Use high-achieving and successful peers as models.
- Model positive behaviors himself.
- Use vicarious reinforcement, that is, make sure students see that positive behaviors will lead to positive consequences.
- Demonstrate and teach good behaviors.

Explain how the principles of behaviorism are useful to you as a classroom teacher.

SUMMARY

- The key element in classical conditioning is association.
- In classical conditioning, there are two types of stimulus (unconditioned stimulus and conditioned stimulus) and two types of response (unconditioned response and conditioned response).
- Three common phenomena in classical conditioning are generalization, discrimination, and extinction.
- Operant or instrumental conditioning is a form of learning in which the consequences of behaviour lead to changes in the probability that the behaviour will occur.
- Reinforcement will strengthen a behaviour while punishment will weaken a behaviour.
- In continuous reinforcement, reinforces are given as soon as possible after the target behaviour is performed. In contrast, the schedule of reinforcement determines when a behaviour will be reinforced.
- Punishment presents the fastest way to changing behaviour but it might be dangerous to an individual.
- Social learning theory believes that students learn by observing or watching and imitating other people.
- The four processes in observational learning are attention, retention, production, and motivation.
- Bandura's reciprocal determination model states that behaviour, environment and person factors interact to influence learning.

KEY TERMS AND CONCEPTS

Terms	Definitions
Classical conditioning	Type of learning which based on the association of a stimulus that does not ordinarily elicit a particular response with another stimulus that does elicit the response.
Conditioned stimulus (CS)	Stimulus that acquired the ability to produce the response because it was paired with the unconditioned stimulus.
Conditioned response (CR)	Response that is similar to UCR but is produced by the conditioned stimulus.
Continuous reinforcement	On continuous reinforcement, reinforcers are given as soon as possible after the person performs the target behavior.
Discrimination	The ability to differentiate between similar stimuli.
Extinction	Process of unlearning a learned response because of the removal of the original source of learning.
Fixed-interval	In a case of a fixed-interval schedule, a behavior will be reinforced after a certain period of time.
Fixed-ratio	On a fixed-ratio schedule, a behavior is reinforced after a set number of responses have occurred.
Generalization	Process that occurs when similar stimuli to a CS produce the CR.
Law of Effect	Thorndike's Law states that behavior that brings about a satisfying effect (reinforcement) is apt to be performed again, whereas behavior that brings about negative effect (punishment) is apt to be suppressed.
Negative punishment	Removing something pleasant will decrease behavior occurrences.

Negative reinforcement	**Removing something unpleasant will increase behavior occurrences.**
Operant conditioning	**Form of learning in which the consequences of behavior lead to changes in the probability that the behavior will occur.**
Positive punishment	**Receiving something unpleasant will decrease behavior occurrences.**
Positive reinforcement	**Receiving something pleasant will increase behavior occurrences.**
Reciprocal determination model	**Bandura's model that states that behavior, environment and person factors interact to influence learning.**
Social learning	**Social learning theory believes that students learn by observing or watching and imitating other people.**
Unconditioned response (UCR)	**Unlearned or inborn reaction to the unconditioned stimulus.**
Unconditioned stimulus (UCS)	**Stimulus that can produce the response without any learning.**
Variable-internal	**A variable-internal schedule is also based on time passing but the time period keep changing.**
Variable-ratio	**On a variable-ratio schedule, the number of responses needed to gain reinforcement is not constant.**

ENDNOTES

1. Bandura, A. (1989). Social cognitive theory. In Vasta, R. (Ed.) *Annals of child development*. Greenwich: JAI.
2. Eggen, P & Kauchak, D. 2007. *Educational psychology windows on classrooms*. 7th ed. New Jersey: Prentice Hall.
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6. Papalia, D. E., Olds, S. W., & Feldman, R. D. 2007. *Human development.* 10th ed. Boston: McGraw Hill.
7. Santrock, J. W. 2008. *Educational psychology*. 3rd ed. Boston: McGraw-Hill.

REVIEW AND DISCUSSION QUESTIONS

1. Of the following, a behaviorist is most likely to study _____.
   A. hormone
   B. animal learning
   C. memory strategy
   D. unconscious mind

2. A dog's salivation to the meat in Pavlov's experiment was the _____.
   A. conditioned stimulus (CS)
   B. conditioned response (CR)
   C. unconditioned stimulus (UCS)
   D. unconditioned response (UCR)

3. Which response did Pavlov measure in most of his experiments?
   A. fear
   B. salivation
   C. eye blinking
   D. pressing a lever

4. In Pavlov's experiment the _____ was similar to the _____.
   A. CS; CR
   B. CR; UCR
   C. UCS; UCR
   D. US; UCS

5. In classical conditioning, the opposite of acquisition is _____.
   A. extinction
   B. generalization
   C. discrimination
   D. conditioned stimulus

6. How does a teacher produce extinction in classical conditioning?
   A. Punish all responses.
   B. Present the CS without the UCS.
   C. Present the UCS without the CS.
   D. Present the UCS without the UCR.

7. Children often learn by watching television. This type of learning is called _____.
   A. the Law of Effect
   B. observational learning
   C. positive reinforcement
   D. reciprocal determination

8. A teacher has decided to give several unannounced quizzes throughout the month of July. He is attempting to use the _____ schedule of reinforcements.
   A. fixed-ratio
   B. variable-ratio
   C. fixed-interval
   D. variable-internal

9. The form of learning in which the consequences of behavior lead to changes in probability of its occurrence is known as _____.
   A. the Law of Effect
   B. social learning
   C. classical conditioning
   D. instrumental conditioning

10. Who discovered operant conditioning?
   A. extinction
   B. generalization
   C. discrimination
   D. conditioned stimulus

11. The terms "positive" and "negative" in both reinforcement and punishment refer to whether _____.
   A. the behavior is good or bad
   B. the behavior increases or decreases
   C. something is presented or removed
   D. reinforcement or punishment is larger or smaller than expected

12. Adham receives a reward from his English teacher after a certain number of compositions submitted. Sometimes five compositions are necessary, sometimes two, and sometimes eight. This is an example of _____ schedule of reinforcements.
   A. fixed-ratio
   B. variable-ratio
   C. fixed-interval
   D. variable-internal

13. An unpleasant stimulus is presented to decrease the frequency of a behavior. This statement refers to the definition of _____.
   A. positive punishment
   B. negative punishment
   C. positive reinforcement
   D. negative reinforcement

14. An unpleasant stimulus is removed to increase the frequency of a behavior. This statement refers to the definition of _____.
    A. positive punishment
    B. negative punishment
    C. positive reinforcement
    D. negative reinforcement

15. A pleasant stimulus is presented to increase the frequency of a behavior. This statement refers to the definition of _____.
    A. positive punishment
    B. negative punishment
    C. positive reinforcement
    D. negative reinforcement

16. A pleasant stimulus is removed to decrease the frequency of a behavior. This statement refers to the definition of _____.
    A. positive punishment
    B. negative punishment
    C. positive reinforcement
    D. negative reinforcement

17. Cookies, candies, and stationeries are examples of _____.
    A. privileges
    B. primary reinforces
    C. concrete reinforcement
    D. vicarious reinforcement

18. Water and food are examples of _____.
    A. learned reinforces
    B. primary reinforces
    C. concrete reinforcement
    D. vicarious reinforcement

19. Which of the following is not a part of social learning theory?
    A. Imitation
    B. Observation
    C. Trial and error
    D. Vicarious reinforcement

20. According to the social learning theory, what people do is largely based on _____.
    A. imitation
    B. reinforcement
    C. punishment
    D. the Law of Effect